Assignment 5

Textbook Assignment: "Pressurization and Air-Conditioning Systems"; and "Oxygen Systems." Pages 3-17 through 4-3.

Learning Objective: *Recognize the operating principle of a vapor cycle air conditioning system and identify system components and their functions.*

ITEMS 5-1 THROUGH 5-2 PERTAIN TO THE VAPOR CYCLE AIR-CONDITIONING SYSTEM USED ON THE E-2 AIRCRAFT.

5-1. In what system component is the pressure of the refrigerant increased to the point that its condensing temperature is above the temperature of the water or air used for condensing purposes?

1. Expansion valve
2. Evaporator
3. Compressor
4. Condenser

5-2. (Refer to figure 3-12 and supporting material in the text.) Which of the following is the flow sequence for refrigerant through the system?

1. Receiver → subcooler → expansion valve → evaparator → subcooler → compressor → condenser → receiver
2. Receiver → subcooler → evaparator → subcooler → expansion valve → compressor → condenser → receiver
3. Receiver → condenser → subcooler → compressor → evaporator → subcooler → expansion valve → receiver
4. Receiver → expansion valve → compressor → subcooler → condenser → evaparator → subcooler → receiver

5-3. The air delivered to the aircraft avionics compartment is controlled within which of the following temperature ranges?

1. 33° ±5°C
2. 38° ±5°C
3. 38° ±5°F
4. 43° ±5°F

5-4. What is the source of power for the compressor and the evaporator fan mounted on the evaporator assembly?

1. Ram air driven motor
2. Hydraulically driven motor
3. Electrically driven ac motor
4. Electrically driven dc motor

5-5. During ground operation with engines running and insufficient ram air across the condenser for cooling, what component allows engine bleed air to be used to increase airflow across the condenser?

1. Thermostatic expansion valve
2. Ram air scoop actuator
3. Ejector air shutoff valve
4. Condenser pressure transducer

5-6. With the equipment cooling switch set to ON, what valve is energized to direct hydraulic pressure to the compressor drive motor and evaporator assembly fan motor?

1. Service
2. Shutoff
3. Lower charge
4. Thermostatic expansion

5-7. From an operational standpoint, what happens to the compressor motor and evaporator fan motor when the aircraft is in flight with the landing gear down, either engine in autofeather position, and the equipment cooling switch in the ON position?

1. Compressor motor and fan motor will continue to operate
2. Compressor motor and fan motor will stop operating
3. Compressor motor will continue to operate and fan motor will stop operating
4. Compressor motor will stop operating and the fan motor will continue to operate

5-8. The high-speed cutout switch will cause the equipment cooling caution light in the cockpit to come on if the refrigerant pressure exceeds what pressures?

1. 225 ±10 psi
2. 225 ±5 psi
3. 250 ±10 psi
4. 250 ±5 psi

5-9. If the high-pressure cutout switch fails to function properly, at what pressure will the relief valve in the compres–sor discharge line open?

1. 323 psi
2. 324 psi
3. 325 psi
4. 326 psi

5-10. What component of the condenser assembly provides a signal to control the position of the condenser flap to regulate pressure?

1. Actuator
2. Expansion valve
3. Pressure transducer
4. High side controller

5-11. What component prevents surges in the refrigerant flow rate of the vapor cycle system?

1. Receiver
2. Evaporator
3. Check valve
4. Thermostatic expansion valve

5-12. The refrigerant temperature in the vapor cycle system is maintained between 29.8° and 32.9° ±0.6°F. This will produce approximately what temperature in the equipment compartments?

1. 36°F
2. 38°F
3. 40°F
4. 42°F

5-13. At what fan inlet temperature will the low temperature cutoff switch de-energize the compres-sor power relay?

1. 28°F
2. 29°F
3. 30°F
4. 31°F

IN ITEMS 5-14 THROUGH 5-16, SELECT FROM COLUMN B THE FUNCTION OF EACH COMPONENT LISTED IN COLUMN A.

	A. Components	B. Functions
5-14.	Subcooler	1. Removes moisture and other contaminants that may be in the liquid Freon 12
5-15.	Receiver	2. Ensures that the liquid Freom 12 will not vaporize prematurely after passage through the thermostatic expansion valve
5-16.	Filter-drier	3. Aids in determining whether servicing of the refrigerant unit is required
		4. Ensures that the thermostatic expansion valve receives an adequate supply of liquid Freon 12 during peal load conditions

3-17. The flow of refrigerant to the outlet parts of the expansion valve is controlled by positioning a metering valve pin. The position of this pin is determined by what factor?

1. Superheat spring setting only
2. Evaporator discharge pressure only
3. Pressure created by the remote sensing bulb only
4. The pressure created by the remote sensing bulb, superheat spring setting, and evaporator discharge pressure

5-18. What part of the expansion valve is designed to ensure that the Freon 12 is in a gaseous state when it returns to the compressor?

1. The metering valve
2. The superheat spring
3. The inlet port
4. The equalizer port

5-19. An overcenter device installed in the evaporator header duct assembly--opens the louvers automatically and supplies cooling air to the avionics gear when which of the following conditions exist?

1. When the aircraft is on the ground and equipment cooling is required
2. When the aircraft is airborne and equipment cooling is required
3. When the aircraft is on the ground and a ground cooling cart is plugged into the aircraft for equipment cooling
4. When the aircraft is on the ground and equipment cooling is being changed from ground cart to aircraft cooling system

5-20. In which of the following system components does Freon 12 changes state occur?

1. The compressor and the receiver
2. The condenser and the compressor
3. The evaporator and the condenser
4. The receiver and the evaporator

5-21. The compressor operates in accordance with which of the following principles?

1. The pressure and temperature of a given volume of confined gas will increase if its volume increases
2. If a given volume of gas is trapped and the area in which it is contained gradually decreases, the pressure and temperature will increase
3. The pressure of a given volume of confined gas will increase and its temperature will decrease if its volume decreases
4. The pressure of a given volume of confined gas will decrease and its temperature will increase if its volume decreases

5-22. The highest temperature and pressure of the refrigeration cycle begins at what device or location?

1. Receiver
2. Condenser
3. Discharge side of the compressor
4. Discharge side of the ther–mostatic expansion valve

5-23. When the system is shut down, what prevents high-pressure discharge from the compressor from motorizing the compressor in reverse?

1. The check valve
2. The relief valve
3. The charge valve
4. The high-pressure cutout switch

5-24. At what differential pressure range across the filter will the bypass device open and permit unfiltered oil to circulate through the compressor?

1. 13.5 to 16.5 psi
2. 16.5 to 18.5 psi
3. 16 to 20 psi
4. 18 to 22 psi

IN ITEMS 5-25 AND 5-26, SELECT FROM COLUMN B THE COMPONENT USED FOR THE FUNCTION GIVEN IN COLUMN A.

	A. Functions	B. Components
5-25.	To facilitate individual group servicing or servicing the system as one complete unit	1. Condenser ejector shutoff valve 2. Purge valve
5-26.	To bleed the system and to attach test equipment or the vacuum pump	3. Charging valves

Learning Objective: *Recognize vapor cycle charging cart heater tank capacity and the oil charginq cylinder's temperature/pressure relation.*

5-27. What is the capacity of the Freon storage bottle in the vapor cycle charging cart shown in fig. 3-18 in the text?

1. 20 pounds
2. 25 pounds
3. 20 gallons
4. 25 gallons

5-28. The vacuum pump has a displacement of 3 cubic feet per minute (cfm) and is rated for continuous duty.

1. True
2. False

5-29. What is the capacity in cubic inches of the heater tank on the vapor cycle charging cart?

1. 280 cubic in
2. 299 cubic in
3. 330 cubic in
4. 360 cubic in

5-30. The oil charging cylinder of the vapor charging cart has a capacity of 68 cubic inches and an operating pressure of 100 psi at which of the following temperatures?

1. 120°F
2. 125°F
3. 130°F
4. 135°F

5-31. Refrigerant cylinders should never be filled to more than what percent of their capacity?

1. 65 percent
2. 75 percent
3. 85 percent
4. 95 percent

Learning Objective:
Indentify components and conditions pf the ECS for the cockpit, cabin area, and the nose avionics compartment of the SH-60B helicopter.

5-32. The SH-60B helicopter cabin cockpit and nose bay environments are controlled by the ECS, which provides both heating and air conditioning within what temperature range?

1. 2° to 71°C
2. 2° to 73°C
3. 3° to 72°C
4. 5° to 70°C

5-33. Bleed air is applied to the air-cycle machine (ACM) through a modulating valve which functions in what capacity?

1. As an on/off valve and pressure relief valve
2. As an on/off valve and temperature control valve
3. As a pressure regulator and relief valve
4. As an on/off valve and pressure regulator

5-34. With ECS selected ON (from engine source), maximum torque available is reduced by what percent?

1. 1.5
2. 2.5
3. 3.5
4. 4.5

5-35. In an overpressure condition, the overpressure switch will cause which of the following actions?

1. The ECS HI PRESS advisory panel light to come on
2. The modulating valve to close
3. System shutdown only
4. None of the above

5-36. (Refer to figure 3-19 and supporting material in the text.) The ECS control panel contains a three-position toggle switch to control the ECS operating modes. What are the three settings for this toggle switch?

1. OFF, ON, and MAN
2. OFF, AUTO, and MAN
3. OFF, ON, and RAM AIR
4. OFF, AUTO, and RAM AIR

5-37. The ECS will automatically shut down under which of the following conditions?

1. Engine contingency power is selected with the contingency-power switch (CNTGY PWR) on either collective stick
2. In any position of the AIR SOURCE ECS/START switch, when starting either No. 1 or No. 2 engine
3. Both 1 and 2 above
4. None of the above

5-38. Fan control is provided by the mission power (MSU PWR) switch, and by what other switch?

1. A 27°C temperature-sensing switch
2. A 27°C temperature-sensing switch located at each fan outlet
3. A 25°C temperature-sensing switch
4. A 27°C temperature-sensing switch located at each fan inlet

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Learning Objective:
Recognize the purpose and function of the aircraft pressurization system to include maintenance and troubleshooting operations.

5-39. What is the total number of cabin pressurization modes of operation provided by the S-3 aircraft pressure regulator control?

1. Five
2. Two
3. Three
4. Four

5-40. (Refer to table 3-1 and supporting material in the text.) During flight operations between 5,000 and 24,000 feet, the isobaric mode maintains the cabin altitude within what pressurization range?

1. 3,500 and 4,000 feet
2. 4,350 and 5,000 feet
3. 4,500 and 5,000 feet
4. 5,000 and 5,380 feet

5-41. The pressure regulator safety valve is an independent pneumatically operated, balanced poppet valve that limits cabin-to-ambient pressure differential to what pressure range?

1. 7+0.5 and -0.5 psi
2. 7+0.2 and -0.2 psi
3. 7+0.2 and -0.1 psi
4. 7+0.2 and -0.0 psi

5-42. The normally open low-pressure switch closes at 13,000 ±500 feet and reopens at what altitude?

1. 5,000 ±500 feet
2. 8,000 ±500 feet
3. 9,000 ±500 feet
4. 11,000 ±500 feet

5-43. Although an AE generally locates and corrects electrical troubles, the AME should be able to check circuits for lease connections and perform continuity checks.

1. True
2. False

5-44. There are how many distinct steps to follow during troubleshooting?

1. Five
2. Six
3. Seven
4. Eight

Learning Objective: *Recognize operating procedures for a multimeter.*

5-45. Which of the following instruments is used to measure direct current, alternating current, and resistance?

1. Direct current meter
2. Alternating current meter
3. Ohmmeter
4. Multimeter

5-46. When measuring resistance, in what position should you place the -dc/+dc/ac switch.

1. -dc
2. +dc
3. +ac
4. Resistance

5-47. When the multimeter is not in use, in what position should you place the range function switch?

1. Lowest resistance setting
2. Highest resistance setting
3. Lowest voltage setting
4. Highest voltage setting

5-48. Which of the following actions should be taken to read the resistance of a component after setting the meter to zero?

1. Keep the meter in the same position
2. Insert the slack test lead in the (+) jack
3. Keep the reading on the left of the second scale
4. All of the above

5-49. Ambient temperature affects the resistance of sensors.

1. True
2. False

Learning Objective: *Recognize the importance of oxygen to include types, characteristic, and the effects of a lack of oxygen.*

5-50. What is the most urgently needed substance to sustain human life?

1. Food
2. Oxygen
3. Water
4. Clothing

5-51. Sea level air pressure is how much greater than air pressure at 18,000 feet?

1. One and one-half times
2. Twice
3. Three times
4. Three and one-half times

5-52. What type of oxygen equipment is required on aircraft capable of flying in the 35,000 to 43,000 feet altitude ranges?

1. Demand type
2. Pressure type
3. Pressure demand type
4. Demand pressure type

5-53. What kind of oxygen is type 1?

1. Liquid oxygen for technical uses
2. Gaseous oxygen for technical uses
3. Gaseous oxygen for aviator's breathing purposes
4. Liquid oxygen for aviator's breathing purposes

5-54. What type of oxygen is type II oxygen, Spec. MIL-O-2720D?

1. Liquid oxygen for technical purposes
2. Liquid oxygen for aviator's breathing purposes
3. Gaseous oxygen for technical purposes
4. Gaseous oxygen for aviator's breathing purposes

5-55. Water vapor content is specified for breathing oxygen in order to prevent which of the following problems?

1. Clogging of the oxygen system with ice
2. Rust from forming in the oxygen system
3. Excessive humidity in the lungs
4. Physical injury to the body

5-56. What is the natural state of oxygen?

1. Solid
2. Liquid
3. Gel
4. Gas

5-57. Oxygen forms what percent by volume of the total composition of the atmosphere?

1. 12%
2. 21%
3. 52%
4. 78%

5-58. What is the most plentiful element in our environment?

1. Chlorine
2. Argon
3. Nitrogen
4. Oxygen

5-59. Which of the following are characteristics of oxygen?

1. Weightless, colorless, and tasteless
2. Tasteless, valueless, and odorless
3. Colorless, odorless, and tasteless
4. Volumeless, weightless, and colorless

5-60. The most rapid oxidation is found in which of the following processes?

1. Rust
2. Combustion
3. Evaporation
4. Liquefaction

5-61. Oxygen is found in which of the following chemical states?

1. Gas or solid only
2. Gas or liquid only
3. Liquid or solid only
4. Gas, liquid, or solid

6-62. One gallon of liquid oxygen weighs how many pounds?

1. 6.00 pounds
2. 8.49 pounds
3. 9.52 pounds
4. 16.00 pounds

5-63. A complete lack of oxygen, which causes death, is called anoxia,

1. True
2. False

5-64. Which of the following statements concerning hypoxia is NOT true?

1. Individuals vary in their reactions to hypoxia
2. The same sensations experienced in suffocation are present in hypoxia
3. The effects of a certain degree of hypoxia on a person cannot be accurately predicted
4. A person may be highly susceptible to hypoxia one day and relatively resistant to it the next

5-65. In order to determine when supplemental oxygen is needed, the aviator must depend on what factor or device?

1. His judgement
2. The altimeter
3. His sensations
4. The flow indicator

5-66. Generally, what parts of the body are first affected by hypoxia?

1. Ears
2. Eyes
3. Lungs
4. Muscles

5-67. At what minimum altitude will hypoxia appreciably impair night vision?

1. 5,000 feet
2. 7,500 feet
3. 10,000 feet
4. 12,000 feet

5-68. At altitudes between 10,000 and 15,000 feet, what is the greatest danger from hypoxia?

1. Headache
2. Drowsiness
3. Poor vision
4. Error in judgement

3-69. Most of the anoxia deaths during World War II occurred in which of the following altitude ranges?

1. 10,000 to 15,000 feet
2. 15,000 to 20,000 feet
3. 20,000 to 25,000 feet
4. 25,000 to 30,000 feet